



## Nauset Marsh Subwatershed

### Cape Cod, Massachusetts

The Nauset Marsh Subwatershed is located in Eastham and Orleans. It has an area of 5,079 acres. Route 6 runs north-south through this watershed. The northeastern portion of the watershed is protected as part of the Cape Cod National Seashore.

The Towns of Orleans and Eastham have proposed that Nauset Estuary be designated an Area of Critical Environmental Concern. Nauset Estuary is a 1,350 acre shallow water system with barrier beaches and dune fields and includes the Nauset marshes, harbor area, and Town Cove. It is at the border of the colder, arctic currents and the warmer Gulf Stream, and as such is in a unique environmental position. A designation would prohibit new docks and piers until a management plan is developed.

The Town of Eastham is considering the establishment of a new ocean beach just northeast of this subwatershed on Town-owned land, between the Cape Cod National Seashore's Nauset Light and Coast Guard Beaches. This project was spearheaded by a citizen group and has filed with the Conservation Commission with the Selectmen's approval.

Salt Pond is experiencing serious water quality problems. Septic systems, road runoff, a possible underground plume from a nearby landfill and fertilizer from lawns have pushed nitrogen levels in the small pond up to four times higher than levels the pond can stand. A Cape Cod Commission study in 2000 found that Salt Pond is the only nitrogen overloaded area of the Nauset Marsh/Town Cove system. Mats of two species of algae, sea lettuce, and mermaids hair are growing over large areas of the pond. According to Division of Marine Fisheries Sanitary Surveys, the series of storm drains from Route 6 contributing water to Salt Pond are not presently impacting water quality for shellfish. The former Cape Cod Watershed Team requested in 2000 that Salt Pond be added to the Massachusetts 303(d) List.

In August 2001, a fish kill of small to medium sized fish occurred in Cedar Pond. The fish kill was believed to be caused by a bloom of algae triggered by nutrients, including leachate from septic systems, lawn fertilizer, and fecal material from wildlife. Recent tests showed a high level of oxygen in the upper level of the pond, but very little below one meter.

A 1996 field investigation by the Army Corps of Engineers found that the area upstream of Route 6/Governor Prence Road was dominated by *Phragmites* and a flap gate restricts flow.

Most of Orleans is serviced by municipal water. About six cottages near the rotary on the Eastham/Orleans town line have service connections to the Orleans water supply. Orleans plans to begin construction of an iron and manganese treatment plant in the end of 2002 to treat water from wells that is currently unpalatable. Orleans does not have a municipal sewer system.

In Eastham, there is a potential public health issue associated with high nitrate levels in drinking water. There are no municipal water or sewer systems in Eastham, but the town is beginning to look at comprehensive water resources management, including both public water supply and alternative wastewater management.

New docks and piers have increased about 25 percent in the past decade in Eastham.

### Stewards:

- Orleans Water Quality Monitoring Task Force
- Cape Cod National Seashore
- Eastham Pond Stewards (formed 2001)

### Studies conducted in the watershed:

- The Coastal Impact of Groundwater Discharge: An Assessment of Anthropogenic Nitrogen Loading in Town Cove, Orleans, MA. November 1983. Woods Hole Oceanographic Institution.
- Groundwater Nutrient Concentrations around Nauset Marsh. 1994. National Park Service.
- Cape Cod Wetlands Investigation. June 1996. US Army Corps of Engineers, New England Division. Field investigation of possibly degraded tidal wetlands (25 acres) at Route 6/Governor Prentice Road.
- The Role of Sediment Denitrification in Reducing Groundwater-Derived Nitrate Inputs to Nauset Marsh Estuary, Cape Cod, Massachusetts. B.L. Nowicki et al., *Estuaries* 22:245-259.
- Tidal Circulation and Flushing Characteristics of the Nauset Marsh System. 1997. Woods Hole Oceanographic Institution. Technical Report WHOI 97-11.
- Cape Cod Coastal Embayment Project (one of the four sites assessed was Nauset Marsh/Town Cove). 1998. Cape Cod Commission.
- Coastal Nitrogen Loading Project: Interim Report. September 2000. Cape Cod Commission Water Resources Office.
- Coastal Nitrogen Loading Project: Final Report. April 2002. Cape Cod Commission Water Resources Office. (one of the four sites assessed was Nauset Marsh/Town Cove).
- Source Water Assessment Program (SWAP) in Eastham, conducted by the Department of Environmental Protection. Final Reports available for four of the five nontransient noncommunity (NTNC) public water supply systems (such as schools) in 2002. Of 45 transient noncommunity (TNC) water suppliers (such as restaurants) in the town, 24 were assessed by 2002 with final reports available for 17 of them.
- Water Resources of Outer Cape Cod. 1998. Cape Cod Commission and Lower Cape Water Management Task Force.
- Cape Cod Atlas of Tidally Restricted Salt Marshes. 2001. Cape Cod Commission.
- Orleans Priority Open Space Project – 2001. The Compact of Cape Cod Conservation Trusts. Created a ranking list of undeveloped parcels that, if acquired as open space, would protect the most important natural resource areas in Orleans.
- Town of Eastham has a contractor performing tests ranging from gas sampling to water quality analysis on the Old Orchard Road landfill, which is in the process of being closed.
- Hydrologic Analysis of the Water Resources of Lower Cape Cod. US Geological Survey. Conducted during 2001 – 2003.
- Water Quality & Habitat Health of the Embayment Systems of Orleans, MA. Feb. 2002. Progress Report of the 2001 Field Season: Water Quality Monitoring and Hydrodynamic Data Collection. B. L. Howes and J. S. Ramsey.
- Nauset Marsh was selected as a priority area for Year 2 of the Massachusetts Estuaries Project, funded by the state and UMass Dartmouth. The goal of the project is to develop critical nutrient loading thresholds for each embayment to aid in water resources planning. They will support federal requirements for the development of Total Maximum Daily Loads for impaired surface waters. This area was evaluated in 2003.

### Who is collecting water quality data and where:

- Orleans Water Quality Monitoring Task Force has 45 sampling stations being monitored for nutrients, DO, Secchi, temperature, and chlorophyll-a, collected in Cape Cod Bay, Nauset Estuary, and Pleasant Bay. The group also monitors water quality in 16 freshwater ponds.

- Town of Eastham has been collecting data on private well water quality for the past year because of concern over elevated levels of nitrate in the drinking water. Approximately 20% of the wells in the town were tested in 2001. Goal is to obtain a comprehensive town-wide assessment of drinking water quality over the next three years.
- Eastham Pond Stewards began collecting data in 2002 on Muddy, Long, Schoolhouse, Minister's, and Moll's Ponds in this subwatershed. Samples are taken once per month June-September. Data collected: secchi, dissolved oxygen, nitrogen, phosphate, total nutrients, chlorophyll a. Will try to sample twice per month during the 2003 sampling season.
- The United States Geological Survey maintains a stream flow gauge in the Mary Chase Marsh, collecting data that will be used in the Massachusetts Estuaries Project.

#### **Management actions taken:**

- Salt Works Circle Stormwater Pollution Remediation. Project involves the installation of stormwater Best Management Practices. A series of infiltration basins will be installed to reduce bacteria contamination to Town Cove. Funded by grant from the Coastal Remediation Program (Year 2000).
- Development of engineering designs for a stormwater mitigation system for the drainage area along Gibson Road. Currently stormwater flows untreated from Gibson Road to Town Cove. Funded by a grant from the Coastal Remediation Program (Year 2000).
- Mary Chase Marsh Salt Marsh Restoration Project. 10 acre salt marsh. Project involves the removal of rocks to expand the channel to a width of 10 feet to restore a more normal tidal hydrology. Several partners including the Massachusetts Wetlands Restoration Program. Cost estimated to be \$20,000. Construction occurred in November 2002.
- The Eastham Natural Resources Department initiated a scallop rescue project with the Cape Cod Lighthouse Charter School students. The project involved stuffing porous bags with netting then floating them from hundred foot lines in parts of Town Cove and Pleasant Bay. Bay scallop larvae drift into the bag and attach themselves to the netting inside.

#### **Subwatershed facts:** (For data sources see the Appendix)

- 21 E sites: 5 – Cape Cod National Seashore Ranger Station, Nauset Rd.; Neighborhood Service Center, Rte. 6; Tonset Rd.; Giddiah Hill Rd.; and intersection of Rte. 6A and Cove Rd., Orleans
- Solid waste sites: 2
- Zone IIs located in this watershed: none
- Interim Wellhead Protection Areas (IWPAs): approximately 23
- Percent of the undeveloped land that is protected (according to 1985/1990 data): 62%
- Acres of existing wetlands: 832
- Certified vernal pools: 5
- Named freshwater ponds: Moll's, Minister's, School House, Long, Muddy (*Eastham*), Duck, Ice House, Reuben's, Boland's (*Orleans*)
- Named rivers or creeks: none
- Beach closures: Coast Guard Beach was closed to swimming for at least one day during the 2001 season due to high enterococcus bacteria counts. Counts were 3-4 times the allowable level.
- Shellfish growing areas: All areas are approved for shellfish harvesting except Town Cove – seasonal closure at tide gate.
- This watershed contains Natural Heritage and Endangered Species Program (NHESP) Estimated Habitats of Rare Wildlife.

### Priorities:

- Develop short and long-term management plans to maintain an adequate supply of potable water, including monitoring of water quality and investigation of practicable alternatives. Explore alternatives of managing wastewater to reduce nitrogen impacts in drinking water, on shellfish habitat, and on marine water quality.
- Develop management plan for the flap gate at Route 6/Governor Prence Road (based on 1996 Army Corps of Engineers study).
- Replace culvert in Mary Chase salt marsh restoration project.
- Implement those salt marsh restoration projects identified in the 2001 *Cape Cod Atlas of Tidally Restricted Salt Marshes* that have been evaluated and prioritized by the town. Sites are: Restriction of Abelino's Creek by Stone Dike (Site EA-6), Governor Prence Road (EA-7), and Route 6 (EA-8).
- Conduct a townwide study of wastewater management in Orleans by 2003 to decide the best solution for each part of town (from the Orleans Local Comprehensive Plan).
- Support Orleans Comprehensive Water Resources Management Plan. Priority for SRF funding for planning.
- Limit future nitrogen loading within the Salt Pond watershed and conduct a comprehensive water quality monitoring program. (Based on the nitrogen loading assessment of the Nauset Marsh/Town Cove System in 2000, Cape Cod Commission).
- Icehouse and Moll Ponds need volunteers to participate in the Pond and Lakes Stewardship Project (PALS), measuring water quality and other characteristics of the ponds.
- Implement BMPs on four stormdrains on Route 6, draining to Minister's Pond, Salt Pond, Christian Creek, and Abelino's Creek; and two stormdrains on Route 6A draining to Town Cove (near Judah's Way) and Boland's Pond. Work with Massachusetts Highway Department to correct. (NRCS).
- Wellfleet Center and the Route 6 corridor and landfill area in Eastham should be considered for public water supply systems (from the Lower Cape Water Management Task Force's Final Report, 1998).
- Establish and continue private well monitoring programs to track private well water quality (from the Lower Cape Water Management Task Force's Final Report 1998).
- Study in greater detail the potential effects of groundwater pumping on the hydrology and ecology of kettle ponds and vernal pools (from the Lower Cape Water Management Task Force's Final Report 1998).
- The town and National Seashore should begin to explore institutional mechanisms for cooperatively managing the shared water resources of the Outer Cape (from the Lower Cape Water Management Task Force's Final Report 1998).
- Improve historical herring run at Cedar Pond.
- Expand citizen water quality monitoring program in Orleans.
- Secure funding to support the new volunteer water quality monitoring program on 10 Eastham ponds by the Eastham Pond Stewards.
- Use the USGS Groundwater Modeling Study to identify and acquire land for future water supply sites.

**Recreation:**

Golf courses: none

Pathways and trails:

- Nauset Bike Trail, Fort Hill, Nauset Marsh Trail, Red Maple Swamp, Cedar Banks, Buttonbush
- [www.capecodcommission.org/pathways/trailguide.htm](http://www.capecodcommission.org/pathways/trailguide.htm)

Public access:

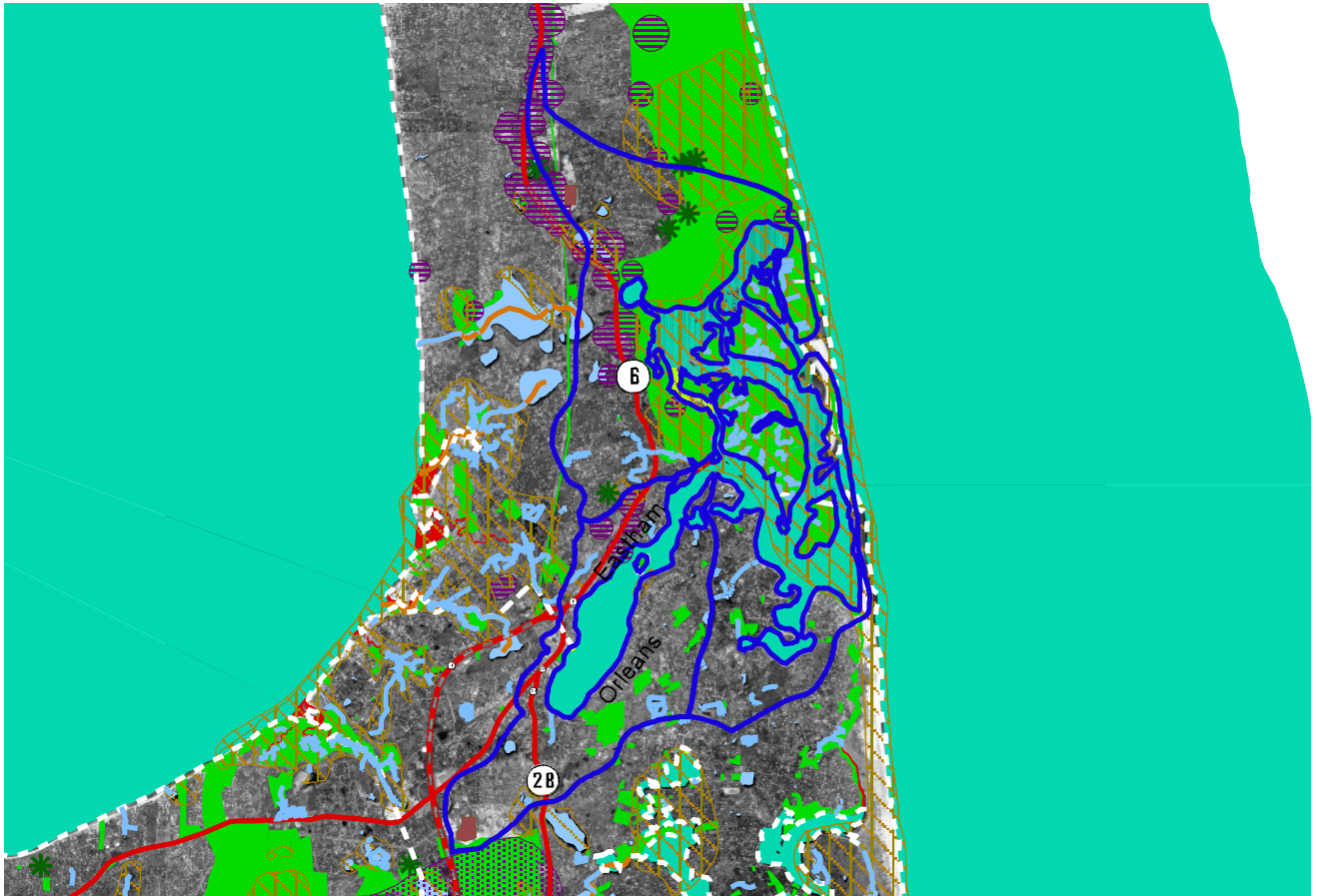
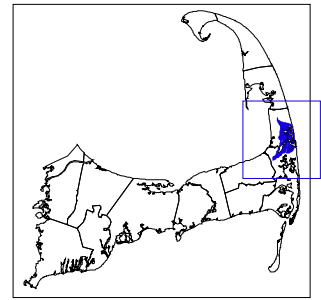
- [www.state.ma.us/dfwele/pab/pabSEmap.htm](http://www.state.ma.us/dfwele/pab/pabSEmap.htm)

Public beaches and landings:

- Nauset Beach, Coast Guard Beach
- 6 landings in Town Cove, 1 in Rachel's Cove, 5 in Nauset Harbor, 2 in Roberts Cove, 1 in Mill Pond, 2

# Nauset Marsh

Eastham and Orleans, MA



## Watershed Resources



0 1 2 3 Miles

### Natural Heritage and Endangered Species Program Data

- Certified Vernal Pool
- Priority Habitats of Rare Species
- Estimated Habitats of Rare Species

### Groundwater Protection Areas

- Interim Wellhead Protection Area
- Zone II
- Solid Waste Facility

Watershed Boundary

Anadromous Fish Run

### Shellfish Growing Areas

- APPROVED
- CONDITIONALLY APPROVED
- MANAGEMENT CLOSURE
- PROHIBITED
- RESTRICTED

Open Space

Streams

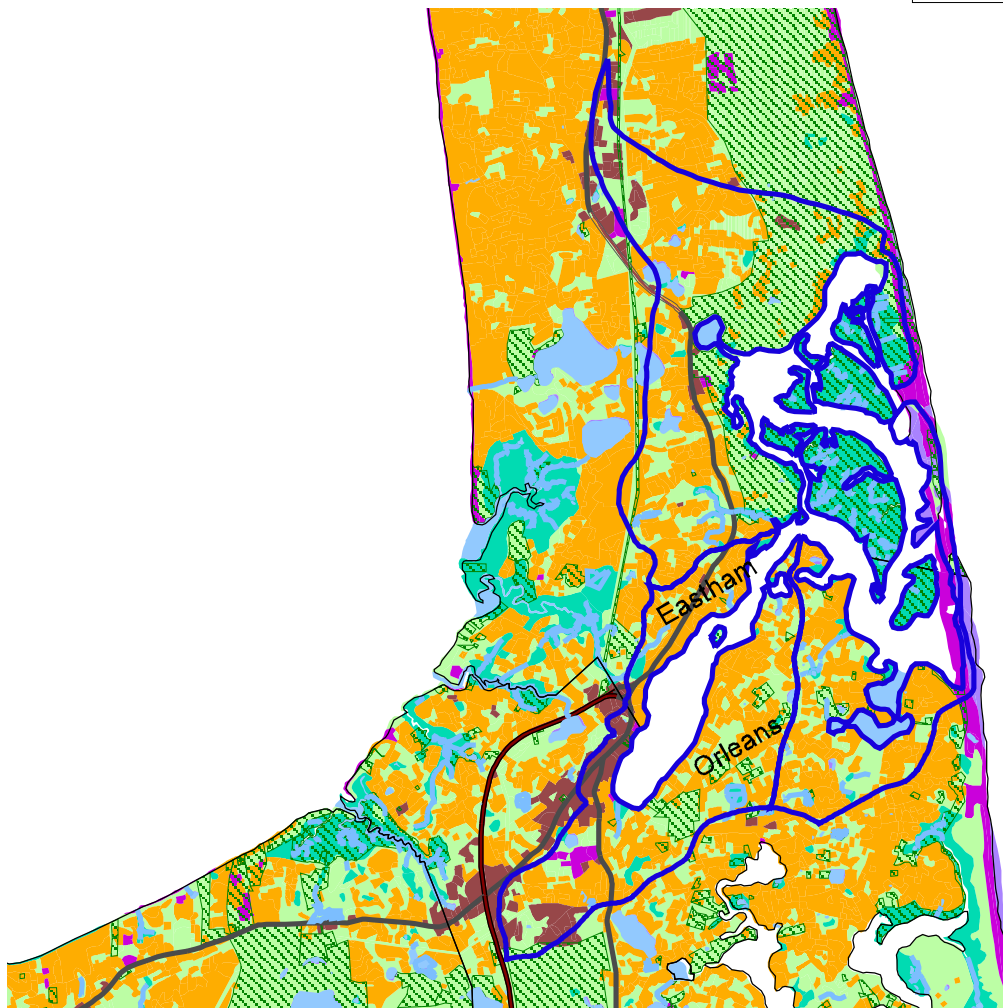
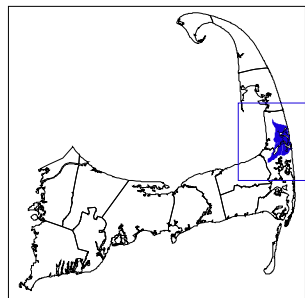
Ponds

Roads



# Nauset Marsh

Eastham and Orleans, MA



## Land Use

### Land Use

- non-residential developed
- open land
- recreation
- residential
- water
- wetland

- Streams
- Ponds
- Watershed Boundary
- Protected Open Space



0 1 2 3 Miles

